Learning From our Students: Photovoice and Classroom Action Research

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Abstract

In this project, Photovoice, a participatory action research tool, was used to establish a relationship between teacher and students and an understanding of students' ideas of, and about, science. The background to the research, the action research and Photovoice methods used, and what was learned from the study are discussed. Suggestions are made for how Photovoice and action research will be applied to future teaching.

Project Background

> The first day, desks are clean, book bags are new, pencils are sharp, and who or what is going to walk into the classroom? What are the views, beliefs, attitudes, and ideas of the students in my room; and how am I going to connect with them and their notions of science?

As a new teacher, I worried about these profound questions during the weeks and months before school started. During my teacher training, we had been drilled with the refrain: "Begin with the students' knowledge and experiences and connect what you want to teach to what your students already know." Based on an undergraduate research project I had worked on with co-author Helen Meyer, I felt a Photovoice action research project could begin to answer my questions about how to "connect with students." Since Photovoice provides students with cameras to create images of their ideas, I thought it would be an engaging activity to begin the school year. As a new teacher, I was both afraid and excited about starting my teaching career with a research project. In any case, I wanted to really implement my theoretical grounding in critical pedagogy, give voice to my students, and teach with my students' ideas in mind.

Purpose of the Study

The overall goal of the project was to explore the use of Photovoice as an action research and pedagogical tool for learning about my teaching and physical science students. Photovoice action research was developed by Wang and Burris (1994, 1997) to study the health of women in developing countries; and, in particular, to identify labor issues affecting the overall health of Chinese women. Wang and Burris (1994) modeled this participatory action research method on Freire's (1968) work with Literacy Circles and South American men. However, while Freire used Literacy Circles to democratically develop concepts of education, empowerment, and consciousness-raising through dialogue (Freire, 1968, 2001), Wang and Burris used photographic images rather than text to reduce barriers to participation for the illiterate women.

The Photovoice process requires participants to take pictures. These images then become a focus for communication between the participant researchers and the researcher. The participants share their ideas behind an image, their beliefs about what the image represents, and their attitudes about the selected image (Kroeger & Meyer, 2005). In a later section, I outline the specific steps I used in my modified version of Photovoice.

In my science classroom, the dialog that occurred after the pictures were taken became an important piece of the action research process. For my students, their pictures became a tool for getting them to think and talk about their science ideas without feeling like I was evaluating their science knowledge. As a student-centered tool, Photovoice allowed me to get to know my students through their own lives and voices, rather than by looking at their past science classes and school records.

Research Questions and Methods

I wanted to answer two primary questions:

1. What do my ninth- and tenth-grade students (14- and 15-year-olds) think about science outside of school?
2. How can I, as their teacher, make use of what I learn about my students to guide my teaching?

To answer these questions, I used a modified version of Photovoice action research. I followed the reciprocal action research cycle suggested by Stringer (1996) (Figure 1), but focusing primarily on application in a classroom rather than a community setting. I used this model because it suggested that I should elicit my students' ideas and permit these to guide classroom instruction and assessment activities.

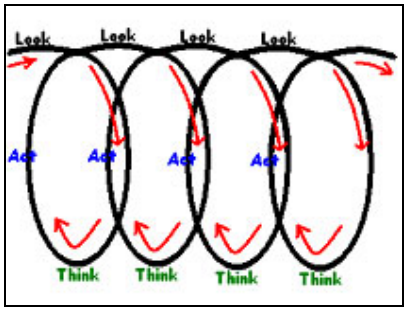


Figure 1. The reciprocal action research cycle.

Ultimately, and aside from its non-invasive nature, the decision to use action research was based on its foundation being good pedagogy. Using action research as my model of inquiry, I was able to analyze and evaluate my teaching and then apply what I learned to my future teaching. In this way, it developed into a productive cycle of asking: "What are my students views/ideas/beliefs?" "How do they apply to my classroom?" "What can I do to further understand their views/ideas/beliefs?"

The Research Project

In the first week of the school year, I assigned each class of students to groups of 4 or 5. Each group had one disposable camera to share, allowing each student to take five pictures. The topic of the pictures they were to take was Show Me Science. They were asked to take a picture in each of three locations; in and around the school, in their homes, and outside their homes. Then, their last two pictures could be of anything that made them think of science. After taking a picture, students completed a Science in a Picture summary sheet (Appendix A) for it. Each student in a group had 1 day to take his or her five pictures, and then the camera was passed to another student in the group and the summary sheets turned in. This process was repeated until each student in the group had taken five pictures. I collected all the cameras at the end of the week and took the film to be developed.

After the pictures were developed, and during a class session, the students selected and mounted three of their pictures on a paper (Figure 2) and wrote three sentences explaining each picture and the science they saw in it. The sentences were written on the back of each collage, serving as notes for students during presentation to others. These pictures then became the center of a "conversation" about what science is outside of school. They also became each student's personal representation of content, and ideas of interest, that I used in the classroom throughout the year. In a constant reintroduction, analysis, and application of student-centered inquiry, the Photovoice pieces were used to elicit student input and extend the classroom environment into students' lives.

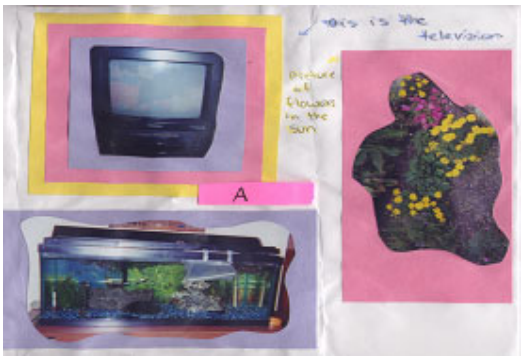


Figure 2. A sample picture collage (clockwise, from top left: television, flowers, terrarium with house plants).

I used the students' pictures in my classroom teaching to get to know my students and a little about their homes, and as a stimulus for discussion and reflection as a relevant science topic came up. I also used them for concept-mapping the ideas represented in them (Figure 3). In addition to using the pictures with the students, I used what I was learning about my students to develop my teaching. Between assignments and projects, I reflected in order to establish links to content and themes, and to develop future applications.

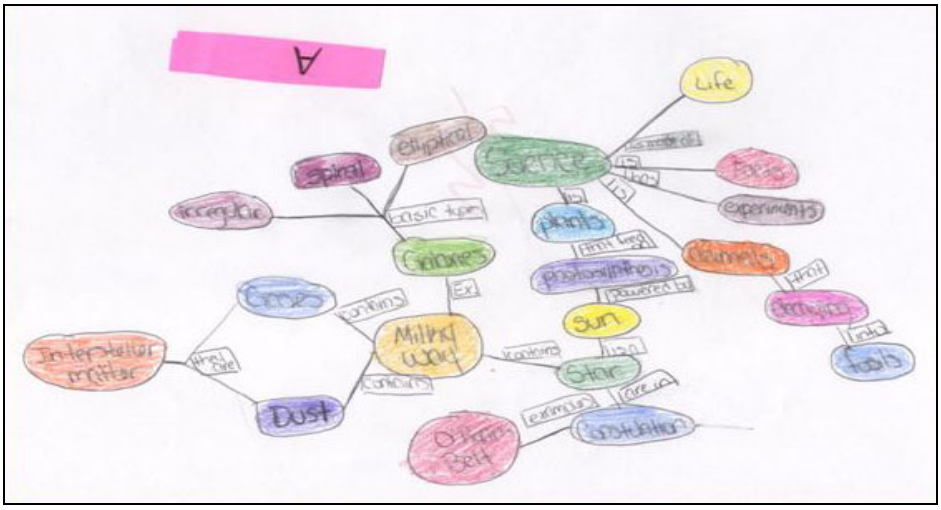


Figure 3. A sample concept map.

Figure 4 maps the various data-collecting points I used in this action research. At each point where students generated data based on either their pictures or a related activity, I reflected on what I had learned from the teaching episode.

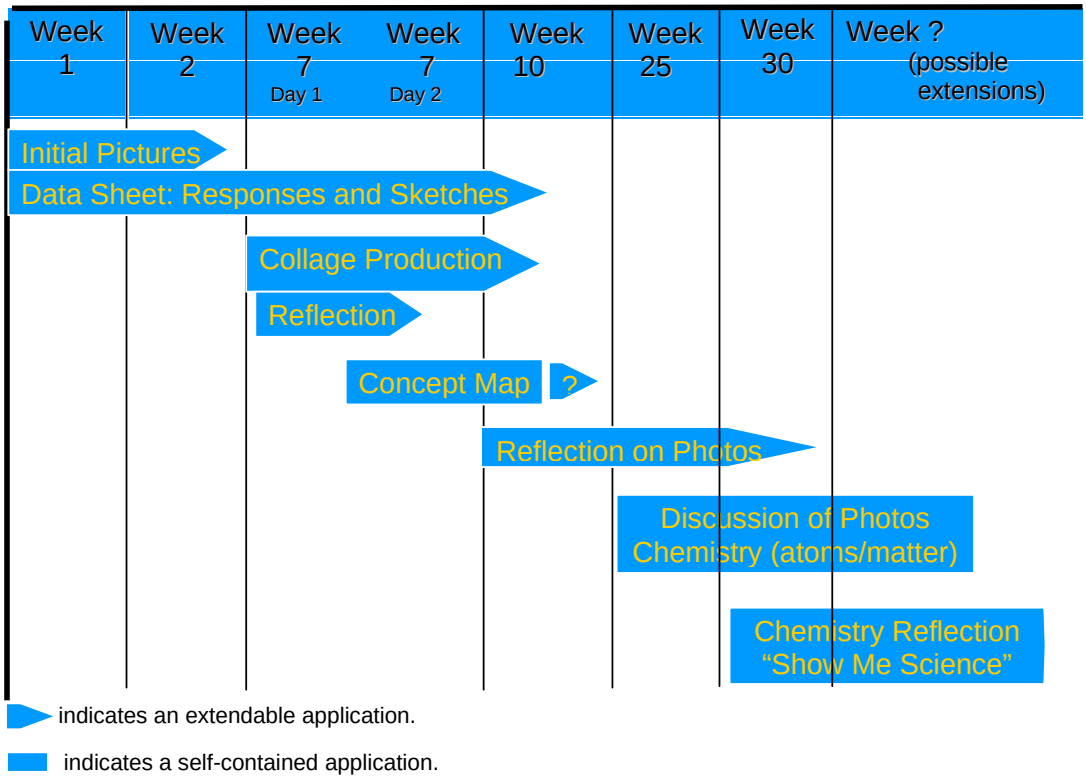


Figure 4. Summary of photovoice activities and applications.

Findings

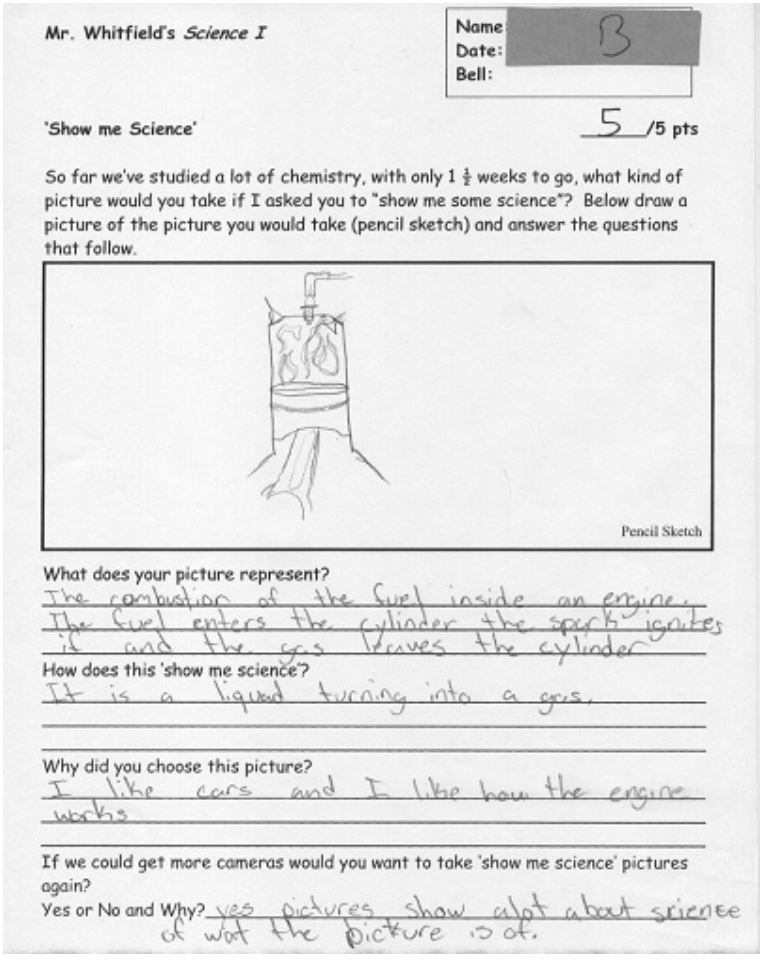
I used the students' photographs, and other items gathered during the school year that arose from the photographs (e.g., concept maps, drawings on quizzes, and paragraphs the students wrote as part of their chemistry reflections), to find themes for my students' ideas about what science is and where they see science in their lives. First, the photographs represented limited categories. Most noticeable was the huge number of pictures that represented biology; grass, trees, house plants, pets, and so on. The second largest category of photographs was of appliances and electronics. Second, when asked to explain their pictures, many revealed recognition of a concept but without any application to a correct and larger science knowledge base. For example, one student remarked about her picture of flowers in a yard: "This is science because flower [sic] product photosynthesis. Photosynthesis is produced in the sun."

My attempt to extend these concepts using concept mapping was met with moderate resistance. The students were not good at constructing concept maps, and I had not instructed them very well. They also resisted trying to draw connections between the pictures they had taken. The students' concept maps did not demonstrate recognition of a hierarchy of science concepts. For those students who could place concepts in a superordinant-subordinant structure, there were limited opportunities to use them for classroom application or extension because the maps were very abstract and difficult to analyze. Therefore, as shown in Figure 4, my teaching did not feature extension or application activities that resulted from the concept mapping.

I found that a much more effective use of Photovoice was to have students reflect on their pictures, and then follow this with whole-class discussion, as it was a way to reintroduce content "produced"

by students. I use the term *produced* because students often treated the items represented in the pictures as "theirs," as if they had ownership of the grass, flower, sky, or pet they had photographed. Student interest in their photos was used to further discussion on topics in class. They would use an item in their picture collage as the starting point for an explanation, or as an example. They made comments like: "When my dog in my picture runs outside, he is accelerating." Finally, the students themselves commented on how images were powerful representations of content. One student even stated that "the pictures are more noticeable" and that he felt it "easier to look at the pictures of science than write about it. I think that you can actually see it more easily than read it and try to visualize," where I assumed the "it" to mean science content.

When I reflected on the students' discussions and comments, I felt I needed to extend my action research to include further forms of representing science other than the photographs, leading me to develop more means of visual representation in my teaching. I also incorporated more visual representation options, for ways to express ideas, on my quizzes and tests. I began allowing students to draw diagrams, and to explain themselves in written passages by accompanying them with sketches (Figure 5). Some students seemed to be relieved that they could now both draw a picture, and respond in prose, on assignments.



Mr. Whitfield's *Science I*

Name: B
Date:
Bell:

'Show me Science' 5 /5 pts

So far we've studied a lot of chemistry, with only 1 ½ weeks to go, what kind of picture would you take if I asked you to "show me some science"? Below draw a picture of the picture you would take (pencil sketch) and answer the questions that follow.

Pencil Sketch

What does your picture represent?
The combustion of the fuel inside an engine. The fuel enters the cylinder the spark ignites it and the gas leaves the cylinder

How does this 'show me science'?
It is a liquid turning into a gas.

Why did you choose this picture?
I like cars and I like how the engine works

If we could get more cameras would you want to take 'show me science' pictures again?
Yes or No and Why? yes pictures show alot about science of wat the picture is of.

Figure 5: A sample drawing and extension for a homework assignment.

This interest in visual representation highlighted some unique differences among students. Some students seemed very comfortable and adept at using images to explain themselves, while not having very strong writing skills. I had seen these students as being weak on content, and would have continued to misunderstand them had it not been for opportunities to use visual representations. My reflections on my Photovoice action research helped me develop my teaching in ways that took my students' interests, knowledge, and ways of expressing themselves into account, providing a clear and direct example of how Photovoice can be used to empower students to participate in instructional decisions and let their voices be heard.

Conclusion

Photovoice served to extend the classroom into my students' lives, and grounded me in a more responsive student-centered model of instruction. It enabled students to contribute to the development of instruction, while allowing me to establish a baseline understanding with my students. The Photovoice action research process used developed into a responsive learning model for me, a new teacher. The flexibility of action research created a dynamic research model, as it provided a systematic way for me to critically analyze and implement my pedagogy. What was lost in objectivity was compensated for by it being a truly non-invasive and responsive research method. What was important, though, was that throughout the process of collecting data and analyzing student work, I constantly reflected on what was happening and used the information in my practice.

This photovoice action research project has generated more questions for me to investigate in my future classrooms. Areas that I have learned about, and areas in which I am interested in using action research to further my understanding, include the following:

1. The visual representation of concepts seems to be a very powerful technique, and this could lead to an investigation of how they can be tailored in the classroom to serve instructional goals.
2. I found that using concept mapping to elicit students' concept hierarchy was very difficult, and am wondering if there are better ways?
3. While the content of the photographs the students produced had limited applicability to the classroom, parallels could be made with relative ease. I would like to investigate possibilities for different ways to frame the project, so that students would be guided to gather photographs with greater classroom application.
4. The students seemed to enjoy having their work, and that of their peers, reintroduced as the focus of instruction--what I call a means of constant application and a recycling of student-centered instruction. After seeing the benefit of this, I wonder if there are ways to measure this benefit to student-centered instruction?

As a final thought, and a reminder of Photovoices's origins, other opportunities to return to the students' photo collages, as a point of discussion or other learning activity, are limited only by how often one can find ways to apply the students' ideas to the teaching process, and by associated time constraints. Next year, I will have another group of new and unfamiliar science students with whom I will need to become familiar. Photovoice will again provide an unobtrusive means to guide my instruction and apply students' ideas to lessons throughout the year. Another group of students will be given a voice in their own instruction, and I will gain insights into their beliefs and values regarding the content I am prescribed to teach.

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Appendix A

Science in a Picture Summary Sheet

Mr. Whitfield's *Science I*

Name:
Date:
Bell:

Science in a Picture

Your task is to take five (5) pictures of the science around you. You will be given a disposable camera to record your images during one afternoon. This is a classroom endeavor; the camera is the property of the class. Failure to take your pictures *and* record your responses will result in a loss of points for the assignment. Also, other students in the class will not be able to record their own images if you do not return the camera promptly (the next day). Also, this is a Science class, so please refrain from taking pictures of friends and the like.

- Inappropriate images will not be accepted, and anything violating the school code of conduct will be dealt with seriously.

Camera icon: _____

Exposure (picture) number from the camera: _____

Location: _____

What is this a picture of? (Two complete sentences)

Picture Sketch:

What were you thinking of when you took this picture? (Two complete sentences)

Describe to someone else why this is science? (Two complete sentences)
